Name: Date:

Polynomial Factoring solution (version 635)

1. **The quadratic formula says if $ax^2 + bx + c = 0$ then $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$. Use the quadratic formula to solve the following equation.**

$$x^2 + 4x + 31 = 0$$

Simplify your answer(s) as much as possible.

Solution

$$x = \frac{-(4) \pm \sqrt{(4)^2 - 4(1)(31)}}{2(1)}$$

$$x = \frac{-(4) \pm \sqrt{16 - 124}}{2(1)}$$

$$x = \frac{-4 \pm \sqrt{-108}}{2}$$

$$x = \frac{-4 \pm \sqrt{-36 \cdot 3}}{2}$$

$$x = \frac{-4 \pm 6\sqrt{3}\, i}{2}$$

$$x = -2 \pm 3\sqrt{3}\, i$$

Notice that i in NOT under the square-root radical symbol!!

2. **Express the product of $7 + 4i$ and $3 + 2i$ in standard form ($a + bi$).**

Solution

$$(7 + 4i) \cdot (3 + 2i)$$

$$21 + 14i + 12i + 8i^2$$

$$21 + 14i + 12i - 8$$

$$21 - 8 + 14i + 12i$$

$$13 + 26i$$

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3. **Write function $f(x) = x^3 + 6x^2 + 3x - 10$ in factored form. I'll give you a hint: one factor is $(x + 2)$.**

Solution

	1	6	3	-10
-2		-2	-8	10
	1	4	-5	0

$$f(x) = (x + 2)(x^2 + 4x - 5)$$

$$f(x) = (x + 2)(x - 1)(x + 5)$$

4. **Polynomial p is defined below in factored form.**

$$p(x) = -(x + 4)^2 \cdot (x - 1) \cdot (x - 4)^2$$

Sketch a graph of polynomial $y = p(x)$.